

CLAIMS:

1. A fluidising admixture for use with sprayable cementitious compositions, the admixture consisting of

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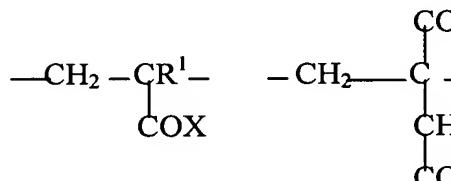
(1) 2-phosphonobutane-1,2,4-tricarboxylic acid;

(2) optionally, citric acid; and

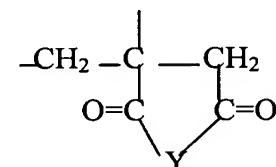
10 (3) at least one polymer derived from ethylenically-unsaturated mono- or
dicarboxylic acids, and characterised in that the polymer consists of

a) 51-95 mole % of moieties of formula 1a and/or 1b and/or 1c

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Ib



Ic

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wherein R' = hydrogen or a C₁₋₂₀ aliphatic hydrocarbon residue;

X = O_aM, -O-(C_mH_{2m}O)_n-R², -NH-(C_mH_{2m}O)_n-R²,

M = hydrogen, a mono- or divalent metal cation, an ammonium ion or an organic amine residue;

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a=0.5 or 1;

R^2 = hydrogen, C₁₋₂₀ aliphatic hydrocarbon, C₅₋₈ cycloaliphatic hydrocarbon or optionally substituted C₆₋₁₄ aryl residue;

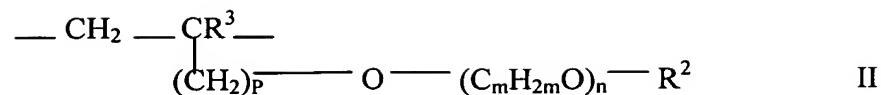
$$Y = O, NR^2;$$

$m = 2-4$; and

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n= 0-200

b) 1-48.9 mole% of moieties of the general formula II

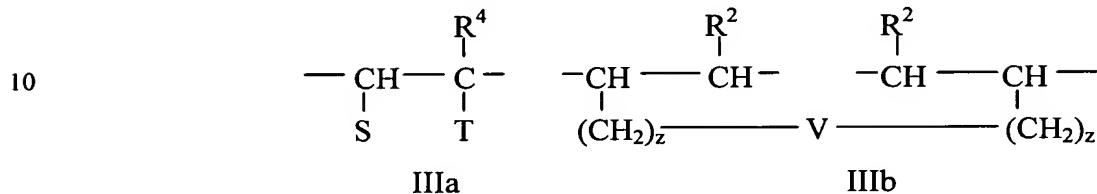


wherein R^3 = hydrogen or C_{1-5} aliphatic hydrocarbon;

5 $p = 0-3$; and

R^2 has the meaning given previously;

c) 0.1-5 mole % of moieties of Formulae IIIa or IIIb



wherein $S = H, -\text{COO}_a\text{M}, -\text{COOR}^5$

15 $T = U^1\text{---}(\text{CH---CH}_2\text{---O})_x\text{---}(\text{CH}_2\text{---CH}_2\text{O})_y\text{---R}^6$

$$\begin{array}{c} \text{CH}^3 \\ | \\ -\text{W---R}^7 \end{array}$$

$-\text{CO---[NH---(CH}_2)_3\text{]}_s\text{---W---R}^7$

$-\text{CO---O---(CH}_2)_z\text{---W---R}^7$

$-(\text{CH}_2)_z\text{---V---(CH}_2)_z\text{---CH=CH---R}^2$

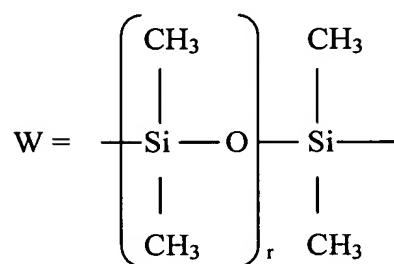
20 $= -\text{COOR}^5$ when S is $-\text{COOR}^5$ or COO_aM

$U^1 = -\text{CO---NH---}, -\text{O---}, -\text{CH}_2\text{---O---}$

$U^2 = -\text{NH---CO---}, -\text{O---}, -\text{OCH}_2\text{---}$

$V = -\text{O---CO---C}_6\text{H}_4\text{---CO---O---}$ or $-\text{W---}$

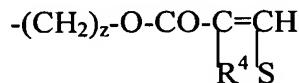
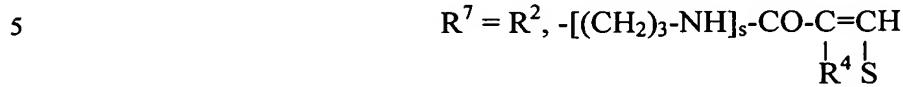
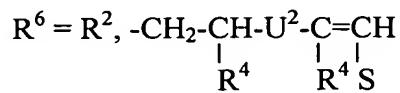
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$R^4 = H, \text{CH}_3$

R^5 = a C_{3-20} aliphatic hydrocarbon residue, a C_5-C_8 cycloaliphatic hydrocarbon residue or a C_{6-14} aryl residue;



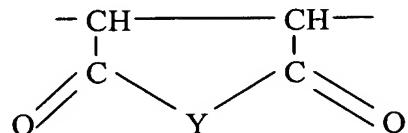
10 wherein $r = 2-100$
 $s = 1, 2$
 $z = 0-4$
 $x = 1-150$
 $y = 0-15$

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d) 0-47.9 mole % of moieties of the general formula IVa and / or IV b:



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IVa

IVb

wherein a, M, X and Y have the significances hereinabove defined.

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2. A fluidising admixture according to claim 1, in which

a) the moiety is according to formula Ia;

R^1, R^2 are independently H or CH_3 ;

30 $X = O_a M, -O-(C_m H_{2m}O)_n-R^2$

$M = H$ or a mono- or divalent metal cation;

$a = 1$;

$Y = O, NR^2$;

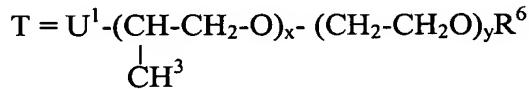
m= 2-3; and

n= 20-150;

b) R², R³ are independently H or CH₃; and

5 p = 0-1;

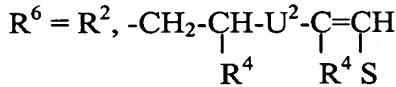
c) the moiety is according to formula IIIa;



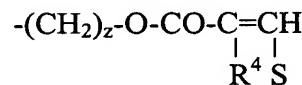
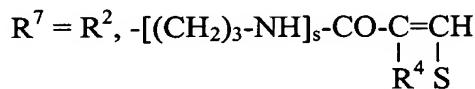
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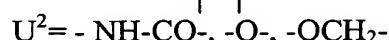
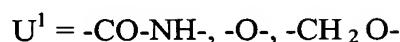
R⁴, R⁵ are independently H, CH₃;



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20 wherein



x = 20-50;

y = 1-10; and

25 z = 0-2.

3. A fluidising admixture according to claim 2, in which

a) the moiety is according to formula Ia;

30 R¹ = H;

R² = CH₃;

X = O_a M;

M = a mono- or divalent metal cation;

$$Y = O, NR^2;$$

$m = 2$; and

n = 25-50;

5 b) $\mathbb{R}^2, \mathbb{R}^3 = H$; and

$$p = 0;$$

c) the moiety is according to formula IIIa;

$S = H, -COO_aM;$

$$T = U^1 - (CH_2 - CH_2 - O)_x - (CH_2 - CH_2 O)_y R^6$$

$$-\text{CO-O-(CH}_2\text{)}_z\text{-W-R}^7$$

$$R^4, R^5 = H;$$

$$R^6 = R^2, -CH_2-CH(U^2-C^4=CH-S^4-$$

$$R^7 = R^2, -[(CH_2)_3-NH]_s-CO-C=\underset{R^4}{\underset{|}{C}}=CH$$

wherein

$U^1 = -CO-NH-;$

$U^2 = -\text{NH-CO-}, -\text{O-}, -\text{OCH}_2-$

x = 20-50;

v = 5-10; and

$z = 1-2$

4. A method of imparting flow to a cementitious composition, comprising the addition thereto of an admixture according to any one of claims 1-3.

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5. A method of spraying a cementitious composition by preparing a cementitious mix and conveying the mix to a spray nozzle, there being added to the mix at preparation an admixture according to claim 1.